

SOIL SURVEY OF CULLMAN COUNTY, ALABAMA.

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DESCRIPTION OF THE AREA.

Cullman County is located in the north-central part of the State of Alabama. The meridian of longitude 87° west of Greenwich and parallel of latitude 34° north intersect about 2 miles west of Bremen, a small village situated in the southwestern corner of the county. On the north it is bounded by Morgan and Marshall counties; on the east by Marshall and Blount; on the south by Blount and Walker; and on the west by Walker, Winston, and Lawrence. The county is in shape a right triangle and contains 474,230 acres or 741 square miles.

The base map used in this survey was redrawn from a county map, which omitted many of the details of drainage and recent culture. Many corrections were made, but it is not nearly so complete in this respect as is desired. About 75 square miles on the Warrior River was covered by a topographic sheet.

The general surface inclination of most of the area is toward the south and the drainage is into the Warrior River. About 30 square miles along the northern border is tributary to the Tennessee River. The divide between the two drainage systems is a comparatively narrow ridge which lies, for the most part, 1 or 2 miles south of the northern boundary. The highest points within the area, usually about 1,100 feet, are found along this divide. The ravines and gorges which form the heads of the north-flowing streams are very deep and narrow, but widen rapidly toward the lowlands of the Tennessee

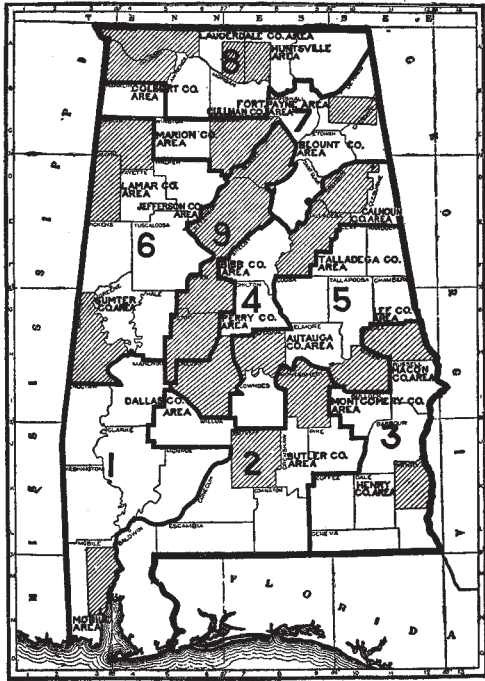


FIG. 14.—Sketch map showing location of the Cullman County area, Alabama.

Valley. In many places near the county line the plateau, or "mountain," as it is locally termed, abruptly terminates in steep declivities, with numerous outcrops of massive sandstone. On the south the surface slope is more gradual and the branches usually rise in rather shallow depressions, or as they unite lie between hillsides of moderate grade. Near the northwest corner of the county, however, there is considerable broken land south of the narrow watershed.

The largest stream wholly within the county is Ryan Creek. It rises a few miles northwest of Cullman and flows west of south and joins Sipsey River near the southwest corner of the county. Crooked Creek, which is 6 or 8 miles farther west, has about the same trend. It leaves the area near the middle of the western boundary. Blevens Creek and a few other small branches drain the northwestern portion of the county. The lower course of each of these streams is a rocky gorge. From a few miles below Trimble to its junction with the Sipsey River, Ryan Creek has many bluffs from 50 to 100 feet in sheer ascent from the water, with steep slopes above leading back to the comparatively level "mountain" top.

The south-central townships are drained by Dorsey, Sullivan, and Marriott creeks. Broglen and Duck creeks receive much of the drainage of the eastern half of the area, while the numerous short tributaries of the Warrior River drain the remainder.

The creeks in the eastern half of the county flow through rather narrow valleys, but in general the land near them is less broken than that along the streams in the western part of the county. Throughout the northeastern townships the main divides are broad and their surfaces undulating to moderately hilly. The relief, of course, becomes more pronounced near the streams and in many instances rather short, steep-sided ravines cut back into the fields. In other cases, however, the extremities of the drainage lines are shallow depressions, which form very desirable farm land.

As a rule the divides between the streams west of Ryan Creek are not so wide as those just described. The deeper valleys of the main streams give the tributaries high gradients, so that the latter in many instances have cut well back toward the middle of the dividing ridges. Therefore a relatively larger proportion of the surface is hilly and broken. In this section there are, near some of the creeks, occasional areas of bench land, ranging in extent from a few acres to 1 or 2 square miles, intermediate in elevation between the uplands and the stream channels. A good example of the larger of these topographic forms is the depression to the north and west of the high ridge on which Jones Chapel is located.

The southwestern part of the area is a spur of the table-land lying between Dorsey Creek and lower Ryan Creek. The margin is rough and broken, but much of the central portion is excellent arable land.

The top of Arkadelphia Mountain is also comparatively level. The surface of each of these elevations ranges between 700 and 800 feet above sea level. Stouts Mountain is another remnant of the table-land left in high relief between the deep valleys of Marriott and Thacker creeks.

The country between the last-mentioned elevations and Warrior River lies several hundred feet lower and the topography is more varied. Many rounded ridges and knobs occur, with occasional nearly level areas that owe their outlines and surface features to a horizontal strata of hard sandstone which resists weathering and erosion much more effectively than the softer shales. The small streams in this section are usually bordered by strips of alluvial soil. Limited deposits of this nature are found on the inner curves of the Warrior River and there are also a few terraces which afford small areas of fine farming land.

It is probable that the first settlements within the present county limits were made near Arkadelphia, about seventy years ago. Emigrants from the counties to the east located in the little valleys north of the Warrior River and for many years their farms were small and the agricultural methods and general style of living remained very simple. Few if any slaves were owned by these people. On the "mountain," as the remainder of the area was called, there were a very few settlers prior to 1870. These depended for a living quite as much upon hunting as they did upon the cultivation of their small clearings. Some owned cattle and hogs, which ranged the woods the year around—a method of stock raising which prevailed until very recent years.

In 1872 the South and North Alabama Railroad, now a part of the Louisville and Nashville Railroad, was completed across the county. The company building this road received from the National Government each odd-numbered section of unpatented land on either side for 15 miles.

In 1873, John Cullman, for whom the county was subsequently named, brought a few German families from Cincinnati to this area and founded the town of Cullman. Some also came direct from Germany and located in and near Cullman. In the following years he and a number of men, cooperating with the railroad company, were very successful in securing settlers from the more northern States.

In the early eighties people from the northwestern part of Georgia, attracted by the cheap lands, moved into this area. Many others followed, and when all the Government land suitable for farming had been homesteaded, the later settlers purchased direct from one of the several land companies, which had acquired title to or were agents for large holdings of the original railroad grant. This immigration still continues. The Georgians are from the farming class of their own State, and as a rule are accustomed to farming in a timbered country.

Clearing the land is a rather slow process, although the stumps of the shortleaf pine, oak, and hickory, which form most of the virgin growth, rot in a few years after the timber is felled or deadened.

Individual holdings seldom exceed 160 acres; in many instances only 40 acres. The improvements usually consist of a one-story frame house, well, and a small barn and outbuildings. The fields are unfenced, stock not being allowed to run at large.

The middle portion of the county is the most thickly settled, and the general character of the improvements is good. Near Cullman there are many well-improved farms.

With the possible exception of a rather narrow belt along the railroad, it is evident from the general appearance that the country is in the earlier stages of its agricultural development. This is especially true of the extreme eastern and western townships. Portions of the latter are thinly settled and there is much desirable farming land yet uncleared.

Cullman, the county seat, with a population of about 3,000, is the principal distributing and shipping point for the county. Besides ordinary commercial interests centered there, it contains a number of factories. The State Odd Fellows' Home for Orphans, St. Bernard's College, and the County Agricultural High School are located near this town.

The country roads radiating from Cullman are good. Most of the streams are bridged and considerable outlay has been made in reducing the grades. Many new roads have been laid out in recent years. All except the most thinly settled sections have rural delivery of mails, and a number of telephone lines cross the county.

CLIMATE.

Since there is no Weather Bureau station in Cullman County, the following table has been compiled from records kept at Decatur and at Oneonto. The former is situated on the Tennessee River, about 30 miles north of Cullman, the latter in Blount County, about 25 miles southeast of the center of Cullman County.

Normal monthly, seasonal, and annual temperature and precipitation at Decatur.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	42	72	0	3.8	2.0	5.5	Trace.
January.....	42	77	- 3	5.9	6.5	5.6	0.2
February.....	44	77	-12	5.4	1.1	5.3	1.5
Winter.....	43			15.1	9.6	16.4	1.7

*Normal monthly, seasonal, and annual temperature and precipitation at
Decatur—Continued.*

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
March.....	53	84	4	6.4	3.9	4.2	.5
April.....	62	92	26	4.6	3.6	11.1	.0
May.....	69	98	37	3.5	1.3	2.7	.0
Spring.....	61			14.5	8.8	18.0	.5
June.....	78	106	47	3.4	1.6	2.8	.0
July.....	81	107	56	4.5	5.2	7.5	.0
August.....	80	104	53	3.4	3.2	6.4	.0
Summer.....	80			11.3	10.0	16.7	.0
September.....	72	99	37	2.8	3.6	5.0	.0
October.....	61	93	33	2.1	4.7	.3	.0
November.....	50	80	15	3.7	3.4	5.6	Trace.
Fall.....	61			8.6	11.7	10.9	Trace.
Year.....	61	107	-12	49.5	40.1	62.0	2.2

*Normal monthly, seasonal, and annual temperature and precipitation at
Oneonta.*

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	° F.	° F.	° F.	Inches.	Inches.	Inches.	Inches.
December.....	43	70	1	4.3	0.6	10.2	Trace.
January.....	43	73	9	5.2	1.8	6.8	Trace.
February.....	42	71	-15	6.4	4.8	4.3	1.7
Winter.....	43			15.9	7.2	21.3	1.7
March.....	54	81	4	6.5	6.9	8.7	Trace.
April.....	60	92	24	4.9	3.1	5.5	.0
May.....	70	94	38	4.8	4.6	8.0	.0
Spring.....	61			16.2	14.6	22.2	Trace.
June.....	76	97	45	4.6	4.4	3.2	.0
July.....	78	103	53	6.2	9.5	4.2	.0
August.....	78	101	50	4.1	2.8	7.4	.0
Summer.....	77			14.9	16.7	14.8	.0
September.....	73	99	34	2.1	1.1	4.2	.0
October.....	61	90	26	2.2	.8	.7	Trace.
November.....	50	79	11	2.4	4.3	2.0	Trace.
Fall.....	61			6.7	6.2	6.9	Trace.
Year.....	61	103	-15	53.7	44.7	65.2	1.7

In general the climate in summer is agreeably tempered by the elevation, and there are not many days in which field labor can not be carried on without discomfort. The nights are rather cool.

In winter the ground occasionally freezes to a depth of several inches, but does not remain in this condition longer than a few days. There is considerable cloudy weather during this season. Most of the precipitation is in the form of light rains, which last for a period of several days. Between these rainy periods the weather is mild and pleasant. A few light snowfalls usually occur each winter.

The growing season for most crops may be said to extend from March to November. Fall-sown rye, oats, vetch, and turnips remain green most of the winter. The growth of these grains, as well as of some of the grasses, is suspended only for the brief periods in which unusually severe weather prevails.

The date of the last killing frost in the spring is generally in the first half of April. In the fall rather heavy frosts may be expected before the last of October. On the higher elevations fruit trees in blossom escape injury when serious damage is done on the level land and in the valleys.

AGRICULTURE.

Two general types of agriculture prevail in this county. In the vicinity of Cullman and southwest along the railroad a considerable variety of field crops is grown on the majority of the farms, and there is also much attention given to certain lines of trucking. In all of the townships which are not so conveniently located with regard to the railway, almost the entire acreage of cleared land is annually planted to cotton and corn. This difference in the methods of farming is not altogether due to the better market facilities of the former locality as compared with the latter, but is due in large measure to a marked distinction in the agricultural habits of the people who occupy the respective locations.

Most of the Germans and other people from the north settled near the railroad. They introduced new crops and put into practice methods of farming which were practically unknown to their southern neighbors. It is almost unnecessary to add that the general adjustment to local conditions has resulted in the abandonment of some crops and the modification of the methods of raising those which were found profitable. But the infusion of new ideas has given a diversity to the agricultural productions of this section which could not otherwise have been attained in the same length of time.

As previously stated the eastern and western townships are largely occupied by people who recently came from Georgia. They are familiar with the cultivation of cotton, but, as a rule, are not accus-

tomed to growing grain (except corn), grass, and other products for the markets, nor have they had much experience in stock raising. In most instances all the cleared land on each farm is planted to cotton and corn. The former is the money crop and usually represents almost the entire income of the year. The latter is mostly consumed by the work stock, but a little is fed to the few hogs which are butchered for home use. The farmers whose means are limited or who are making the first payment on their land must necessarily depend upon cotton, which is a safe crop and gives immediate returns. It is also the basis of credit with the local merchants. There are many farmers, however, who could adopt a more diversified type of farming if they so desired, but who persistently follow cotton growing to the exclusion of other crops.

According to the county assessor's returns for 1908, approximately 107,206 acres of land are now under cultivation. More than half of this is devoted to cotton. In the eastern and western townships the cotton acreage is relatively higher than in the middle part of the county. The production for 1908 was about 21,000 bales, the general average for the county being reduced by dry weather in August.

Corn is next to cotton in importance, but since practically all is consumed on the farms, it is only indirectly a source of profit.

Sweet potatoes are an important crop. In 1908 7,750 barrels were shipped from Cullman. The net price received was about \$1.50 a barrel. The quality is excellent and considerable attention is given to the production of those varieties adapted to particular markets. The Jersey sweets are preferred by buyers in the northern cities, while the larger and softer Dooly yams meet the demands of the southern markets. Although the prices vary considerably from year to year the crop is a profitable one. The yield ranges from 100 to 200 bushels per acre, and second crops such as winter oats and rye may be planted on the ground after the potatoes are dug.

In 1908 50 carloads of strawberries were shipped from Cullman. The production is steadily increasing and represents the aggregate yields of a large number of small producers. Many farmers have a few acres planted, but there are practically no large fields devoted to this fruit. The soil and climatic conditions favor the production of those varieties having a fine flavor and possessing good shipping qualities. Cullman berries have an enviable reputation in Detroit and also in other northern cities where they are becoming known.

Raspberries and grapes are successfully grown. The cultivation of the latter was introduced by the Germans, and formerly considerable wine was made. The industry has since declined and the vineyards have been generally neglected.

Some very fine apples, pears, and peaches are grown. Some careful growers have secured highly profitable returns from small apple

and pear orchards. In size, color, and flavor the fruit compares favorably with that from the better-known fruit-growing sections of other States. A good many people who have attempted fruit culture have met with very poor success. In many instances locations unsuited for orchards were selected and varieties were chosen from various other localities without regard to their probable adaptation to conditions existing in the area.

It does not seem reasonable that varieties of fruit originating upon or found well adapted to the heavy soils of the limestone valleys or the cherty ridges occurring in the Appalachian Mountains should find the Dekalb soils altogether congenial. With regard to soil adaptations preference should be given to trees from regions where the Dekalb and associated series prevail. In many instances peach trees are obtained from the comparatively heavy soils of the Piedmont region and planted on the lighter phases of the Dekalb fine sandy loam. It has been found in this area that peach trees generally thrive best on the highest ridges of Hanceville loam, and the red phases of the Dekalb occasionally occurring in elevated situations. This is due in part to the better air drainage and freedom from frosts, but it may also indicate the superior adaptability of this red land to the particular requirements of certain varieties.

In all cases the higher ridges of the Dekalb fine sandy loam are to be preferred to the comparatively level soils of the same type or to the loam. Since damage to the bloom often occurs in the spring and is the chief cause of crop failure, it seems probable that certain northern slopes of the Dekalb stony loam should afford favorable sites for orchards. The location should be high, as compared with the land for some distance to the north, and all the timber in the immediate vicinity should be removed, except on the crest of the hill to the south. This belt of forest would tend to retard the warming of the soil on the slope below, which is the chief desideratum in the selection of such a site for an orchard. The small orchards on the farms generally receive some cultivation, but the necessity of spraying, pruning, and thinning is given little consideration.

In the culture of cotton and corn, commercial fertilizer is generally used. In most brands cotton-seed meal usually furnishes the nitrogen. A high percentage of acid phosphate is preferred by most farmers. It is generally conceded that all these soils respond to potash, and most crops are benefited by its application. Some high-grade fertilizers carrying considerable nitrate of soda are used by strawberry growers.

The Dekalb soils are very deficient in humus. In any plan of fertilization the increase of the vegetable matter should be given first consideration. A larger amount should be returned to the soil than is obtained by the use of cowpeas alone. The manner in which the

latter are usually grown supplies nitrogen to the soil, but does not materially raise the content of humus. If the latter were liberally increased the physical condition of the soil would not only be improved, but the presence of humic acids would render available more of the mineral constituents—potash and phosphates—and also increase the efficiency of the mineral fertilizers artificially applied. This principle should not be overlooked in considering the fertilizer requirements of the types generally under cultivation.

The Dekalb soils are also deficient in lime. In the few instances where it has been used good results have followed. This mineral should be used in connection with applications of manure, or when green crops are plowed under. Where immediate results are not required and a permanent improvement of the soil is desired applications of finely ground untreated phosphate rock would be beneficial. Both lime and phosphoric acid would be obtained, and if a rotation of crops were adapted calculated to keep up the humus content the nitrogen supply would take care of itself. The present practice of planting cowpeas between the rows of corn or sowing them broadcast in open fields is to be commended, but in most cases the tops of the plants are removed and a rather small proportion ever finds its way back to the soil in the form of manure. The nitrogen rendered available by the peas stimulates a better growth in the succeeding crops, which also makes heavier demands upon mineral constituents. If practically the entire crop is removed from the land, as is the present practice with regard to corn, and in many cases with other crops, no permanent improvement of the soil results. On the contrary, there is a decided tendency to impoverish it. The Dekalb soils do not have the depth, and, judging from their geological origin, do not possess the degree of permanent fertility which is found in valley lands or those soils derived from a greater variety of rocks. The ease with which the Dekalb fine sandy loam and the Dekalb loam may be kept in fine physical condition, combined with the favorable climate, insures crop yields, notwithstanding the poor cultivation often given and the generally low humus content. The indefinite maintenance of their productivity, however, demands less exhaustive methods than now prevail on most of the corn and cotton farms.

For most crops each of the above-mentioned types should be plowed deep and the lighter phases of the Dekalb fine sandy loam should be stirred deep enough to mix the silty material of the subsoil with the relatively sandy surface soil. This gives a soil of good physical composition and absorptive capacity. Practically all the types, with exception of the Dekalb stony loam and a part of the Huntington silt loam, are capable of absorbing and holding enough moisture under proper management to carry a crop over any of the dry periods

which occur in the growing season. Cultivated crops should be given frequent shallow cultivations.

On much of the cultivated land near Cullman winter rye and oats are grown. The same kind of cover crops should be more generally sowed in the cotton-growing sections. A practicable rotation for most farms would include fall-sown oats or rye, with vetch or clover, followed by cowpeas sown broadcast. The third year corn or cotton should be planted.

Bermuda grass and Japan clover do well on all types except the lightest phases of the Dekalb fine sandy loam. Where the ground has been cleared and cultivated for a few years both of these crops will establish themselves if given an opportunity to do so. The clover appears along the roadsides and in all old fields in settled sections of the area. The Bermuda grass may be easily planted by dropping pieces of the sod in newly plowed land, and, since it spreads by runners, it soon covers the ground and forms a dense sod. The grass makes a vigorous growth from six to eight months of the year. It is relished by all stock and it seems a conservative estimate to state that 1 acre will support a cow for six months of the year. The small pasture lots found on a few farms are overgrazed—mules, cattle, and hogs all being allowed to run in the inclosure at all seasons.

These valuable plants used in permanent pastures may be made the basis of a system of farm management which would include stock raising. Green winter feed may be cheaply obtained by raising winter oats, rye, and vetch, all of which do well, and cowpeas, soy beans, and sorghum will each produce very heavy yields, even on poor land. Thus a succession of forage crops can be had during the greater part of the year. More hogs should be raised, as cowpeas, peanuts, and chufas or peas and some corn can be cheaply supplied for feed from the farm. All of these crops, as well as others, are grown, but their use in the manner and for the purpose indicated is very rare. This plan necessitates considerable fencing on each farm, the erection of better buildings, and also requires the personal attention of the owner. It has much to commend it, especially to those farmers who are located a considerable distance from markets and who have a considerable proportion of their land cleared.

The present demand for pork is largely supplied from the packing houses in the northern cities. Approximately 1,000,000 pounds of ham, bacon, and side meat are annually retailed in Cullman, much of it being sold on credit to farmers, who in turn practically obligate themselves to produce cotton.

The present farming population of the county numbers about 18,000, with perhaps 3,000 more in the towns and villages. The total number of live stock, approximately 7,000 cattle, the same num-

ber of swine of varying ages, and about 800 sheep, is decidedly too low considering the number and size of farms. In many instances recent settlers have very little of the land cleared, but on the older farms from one-third to three-fourths may be given as a rough estimate of the average acreage under cultivation.

According to the assessors' returns for 1908, the value of all lands, including improvements, is \$2,340,200, which represents about 40 per cent of the actual value. The increase in value of late years has been rapid in all parts of the county. Near the railroad improved farms have more than doubled in value in five years. Uncleared land is also held at a higher price than prevailed a few years ago. Many farms are mortgaged for a considerable part of the value, especially in the newer sections, and rather high rates of interest prevail.

There are very few tenant farmers in this area. So long as present conditions obtain there will be very few large estates of cultivated land operated by renters or hired laborers. With the exception of a few families near Hanceville, there are no negroes in the county. There is no class of people here from which very many farm laborers can be drawn. The Germans and most of the Georgians and native Alabamians are essentially home makers and prefer the ownership of even a small farm to any form of renting or leasing.

As a larger proportion of the area is being brought under cultivation the general trend of agriculture is toward the production of crops other than cotton and corn. The discouraging experiments that marked the early attempts at truck raising are gradually giving place to the profitable culture of potatoes, strawberries, and other crops. This is due in some measure to the cooperation of the growers in marketing their products, and is also the result of experience. The German Farmers Shippers' Association handles much of the truck business. Most of this produce goes to northern cities, but Birmingham and the mining towns near it also afford a good market. There is a strong demand for poultry, dairy products, and good live stock of all kinds.

SOILS.

With regard to their origin and geological relationship the soils of this area are comparatively simple. They are residual, being derived directly from the underlying sandstones and shales. Very limited areas of alluvial soils are found in the southern part of the county, but the material composing them has, in the main, been transported such short distances and suffered such a slight degree of change that mineralogically these sedimentary soils do not differ greatly from those which are strictly residual.

Throughout this part of the Cumberland Plateau the superficial strata consist of nearly horizontal beds of sandstone and shale of

Carboniferous age. In some of the deepest gorges on the north line of the county limestone is exposed, but it has contributed nothing to the soils, except in the immediate vicinity of the few outcrops. No metamorphic or crystalline rocks were found at any point in the area surveyed.

In general, in the eastern and northern portions of the county, the upper beds of sandstone, or those most frequently exposed by the minor inequalities of the surface, range in thickness from a few inches to several feet. The interbedded shales and occasional layers of clay usually exceed in their total thickness the aggregate mass of the sandstone. The basal members, as shown in the deeper stream gorges, consist largely of massive sandstones with relatively thin beds of shaly rock.

Most of this sandstone is fine grained, rarely coarse textured, and only occasionally contains any quartz gravel. Mica flakes are noticeable and the iron content is high enough to give quite pronounced brown-red tints where disintegration has begun. Pieces soft enough to be crushed in the hand are found to consist largely of rather angular, iron-stained quartz grains of appreciable size, but there is also more or less silt and a little clay present.

A very common phase, observable in road cuts, is a heavy bedded grayish sandstone which, as it yields to the agencies of dissolution that act beneath the soil cover, assumes a red color to a depth of a foot or two, and becomes so friable that it is easily broken by a light blow from a hammer. This decaying portion, and also the pieces of rock included in the subsoil proper, absorb water so readily that they contribute to the moisture holding properties of the soil mass.

In a few instances the stratum immediately below the subsoil is hard and slaty and interferes with the subdrainage. The same effect occasionally results from the presence of a rather heavy layer of clay or highly argillaceous shale forming the lower subsoil. As a rule the sandstone is more or less seamed and fissured and the shaly material is so varied in composition and structure that no impervious zone is found near enough to the surface to affect the soil.

The softer strata lying between the sandstone beds range from thin red and brown layers, which consist chiefly of very fine sand cemented with iron oxide, to light-colored clayey shales. The latter are usually thin layers that in many instances are beds of white unctuous clay a foot or two in thickness. Some of the lower members of the shale beds are slightly carbonaceous but none of them are calcareous.

On all of the table-land the weathered residue of the surface rocks forms a soil body ranging in thickness from a few inches on the steepest slopes to several yards on the comparatively level areas. The surface inequalities have caused sufficient creep and wash of the upper portion of this material to commingle pretty thoroughly the

particles from all sources. To this agency is due, in large measure, the rather limited range in texture of the soils, silty loams and fine sandy loams predominating in all parts of the area. While there are not very great differences in the mineralogical character of the superficial formations, the heaviest shales and coarsest sandstones would give quite diverse soils if the weathered products of each remained in place.

In the south-central townships very heavy beds of true shales constitute most of the country rock. They are generally highly argillaceous, are dull green, gray, and occasionally purplish in color, and weather to reddish-yellow clay. They are found from the stream channels almost to the tops of the table-land and the highest hills. The elevation of much of this region is lower than that of the plateau to the north. This, as well as the more varied topography which it presents, is due to the readiness with which the shales yield to erosion. The steep flanks of the mountains are usually strewn with rock from the sandstone capping the summits. Frequently the soil contains considerable sand from the same source, but at a slight depth the soil of the slopes consists chiefly of weathered shale, usually a stiff clay. The characteristic shale topography consists of rounded ridges and knolls. In such areas the soil mantle is thin and the surface usually carries more or less debris from the harder portions of the rock.

The occurrence of comparatively thin beds of sandstone in the heavy deposits of shale has given rise to the bench lands and some of the flat-topped elevations found near Warrior River and its tributaries in this region. Such topographic forms are rather conspicuous features and usually the soil on them is derived almost entirely from the sandstone.

All of the residual soils have been correlated with the Dekalb series. This series has a wide distribution in the northeastern part of the State, where sandstones and shales of the Coal Measures have extensive exposures. The horizontal position of the Carboniferous strata of this area has given soils superior in agricultural value to most of those derived from similar rocks which have been more disturbed. Not only does this soil mantle have a greater average depth, but it has not lost through excessive erosion such a large proportion of the finest constituents, as occurs in somewhat similar regions of comparatively high relief.

In a few places a soil derived from a hard reddish-brown sandstone has an unusually high percentage of clay and is characterized by the deep-red color of the subsoil. While the rock associated with this type, and from which it is derived, contains a higher percentage of iron than the average of the sandstone in this region, this factor does not satisfactorily account for the high degree of fertility which

this soil maintains after many years of cropping. It has been correlated as the Hanceville loam.

The limited alluvial deposits on the streams in the southern part of the area consist chiefly of weathered material of local origin. Owing to the high gradients the deposition has been confined chiefly to the comparatively coarse materials. Much of the latter is a fine sand and therefore fine sandy loams predominate along the Warrior River and most of the smaller creeks. The alluvium of the former evidently contains but little debris from the limestone outcrops in Blount County. Along the small streams, which have no territory tributary to them except shale land, the alluvial soils are generally silt loams.

The better-drained soils of the above character have been correlated with the Huntington series. It is probable that in their general minerological composition they are inferior to some soils of this series derived from a greater variety of rocks. The physical structure, however, is good. The present agricultural value depends largely upon local drainage and the artificial increase of the humus content.

Two local types, besides considerable areas of Rough stony land, also occur in the southern part of the area.

All of the area was originally covered with a rather open forest of shortleaf pine and deciduous trees, oaks and hickories predominating. Such a vegetal covering is not conducive to the accumulation of humus, most of the organic matter oxidizing upon the surface instead of becoming incorporated in the soil. It was also customary from the earliest occupancy of the adjoining region by white settlers to burn over the mountains to improve the pasturage and facilitate the hunting of deer and turkey.

The name and the actual and relative extent of each of the types mapped is given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Dekalb fine sandy loam.....	172,800	36.2	Huntington fine sandy loam..	3,072	0.7
Dekalb loam.....	131,200	27.7	Hanceville loam.....	2,752	.6
Dekalb stony loam.....	78,848	16.7	Holston fine sandy loam.....	1,152	.2
Dekalb shale loam.....	59,712	12.6			
Rough stony land.....	18,816	4.0	Total.....	474,240	
Huntington silt loam.....	5,888	1.3			

DEKALB STONY LOAM.

The distinguishing features of the Dekalb stony loam are the rough topography, stony surface, and variable depth or thickness of the soil section.

The soil is usually a fine sandy loam, 10 or 15 inches deep, containing considerable silt and but little clay. The first few inches of virgin soil is very friable and loamy, dark gray in color, and open in structure. The latter quality is due in part to the included gravel and small stones as well as to the high content of vegetable material. Below this surface loam the material is a slightly coherent silty fine sandy loam, gray-brown or sometimes slightly reddish-brown in color. In cultivated fields the vegetable matter rapidly disappears and the soil assumes a gray or gray-brown color, and is generally covered with sandstone fragments. Washes and gullies are frequently a feature of hillside fields, for the soil yields readily to erosion.

The subsoil is a reddish loam or fine sandy loam more compact and retentive of moisture than the soil. In most instances it contains sandstone fragments of various sizes and in all stages of disintegration. The lower subsoil consists chiefly of the more resistant fragments of sandstone, with interstitial material derived in part from the slope above. Frequently the subsoil rests directly upon a soft, pink or reddish rock which is the disintegrating portion of the massive gray sandstone common to this region.

When relatively thick beds of shale occur, the subsoil contains a higher percentage of clay. On the slopes in such localities the weathered edges of successive members of the shale beds form the subsoil. These may range from arenaceous layers to highly argillaceous strata, with an occasional trace of carbonaceous material. Necessarily the subsoil may vary considerably within short distances. Differences which might greatly affect the water-holding capacity on level land are offset by the high surface gradient and consequent thorough drainage. Occasionally these shale phases are traceable by the native vegetation, the hickories and poplars preferring such situations, while oaks are more commonly abundant on the soil overlying sand rock.

As a rule the soil over the shales does not differ greatly from that above the sandstone. The creep and wash of surface debris on the slopes has usually resulted in a pretty thorough mixing of all the loose materials. This is the case on the long steep hillsides bordering the larger streams.

In general there is a very easy gradation along the crests of the hill-tops between the upland types and the Dekalb stony loam. The latter may have but little stony material upon the surface. Farther down the slope rock debris, flat sandstone, bits of shale, and gravel are more in evidence in the soil, while the subsoil partakes of the nature of the strata immediately below it. Near the stream channel heavy ledges of rock are usually exposed.

In the southwestern part of the area no close line can be drawn between this and the Rough stony land. Near Warrior River and on

Mariott and Sullivan creeks, small areas of fine sandy loam which are comparatively level, but thickly strewn with hard gray sandstone fragments, some of which are a foot or two across, have been included in this type. A few areas of bench land with very stony surfaces are found. They are locally termed "post-oak flats."

Probably less than 2 per cent of the type is cleared. Most of it is covered with a mixed growth of pine, oak, and hickory. Black gum, poplar, and sycamore occur, but are not abundant. Much of the best timber has been removed and the present covering is mostly a second growth. Sourwood, cucumber, holly, bay, haw, and other shrubs form part of the undergrowth, with sedge grass in the open places. There is a little wild cane remaining along the streams, but in general this land does not furnish much pasture.

A large proportion of this type should remain timbered. At the present rate at which the more desirable Dekalb fine sandy loam and Dekalb loam are being brought under cultivation, the time is not far distant when this and the Rough stony land will be the only forested land in the county. Fires do much damage to the young trees, but public sentiment against unlawful firing of the woods is increasing, and this, coupled with the results of the stock law, tends to preserve the present growth of young timber.

The cheapness of most of this land, \$4 to \$10 an acre, tempts many men of limited means to purchase a 40 or 80 acre tract and clear the best portion. In many instances, however, the results are unsatisfactory. The soil washes so easily that it can not be maintained in a condition of tilth suitable for corn or cotton. Sowed crops could be more easily managed. When cleared land of this type forms part of a farm it could be utilized to good advantage as permanent pasture for Bermuda grass and Japan clover. On some hillsides, where the relative elevation gives good air drainage, desirable locations for orchards may be found. Those phases which have a red or reddish-yellow subsoil are to be preferred for fruit to those which are lighter colored.

The following table gives the average results of mechanical analyses of fine-earth samples of Dekalb stony loam:

Mechanical analyses of Dekalb stony loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
20203, 20205.....	Soil.....	0.7	1.2	8.5	36.7	15.2	29.5	8.1
20204, 20206.....	Subsoil.....	.8	2.2	6.7	38.8	15.4	27.9	8.1

DEKALB SHALE LOAM.

The soil of the Dekalb shale loam to a depth of 5 or 6 inches is a friable silty loam. It usually contains a small amount of fine sand and a variable amount of clay. The proportion of the latter increases with depth. The first 2 or 3 inches of virgin soil consist chiefly of fine sand and silt and considerable organic matter, with just enough clay to give it a low degree of coherency. Below 6 inches the material is quite heavy, and when saturated it is plastic and somewhat adhesive. In old fields the surface has a tendency to be slippery, if wet, but this is modified by the abundance of shale fragments. The color is light yellowish clay tending to reddish brown. In many instances the shale fragments and brown ferruginous gravel are very abundant, determining to a considerable extent the surface color.

The subsoil is a reddish clay or clay loam, heavier and more compact with increase of depth. It generally has a coarsely granular structure which is due in part to the high clay content, and also to the angular form of the bits of included shale. As the latter disintegrates it generally assumes roughly cubical forms.

The lower subsoil is generally a rather compact mass of highly argillaceous shales. The thin horizontal layers are crossed by innumerable vertical and oblique seams, but the material as a whole is almost impervious. Excepting the portion which has suffered considerable disintegration it is not a ready absorbent of water, and therefore unfavorably affects the moisture conditions in the upper soil where it is shallow. Artificial exposures usually consist of angular fragments ranging in size from a fraction of an inch to several inches across. The clayey layers are generally dull gray to greenish purple, while those which include more very fine sand weather to brown and yellowish tints. The latter evidently contain more iron and are also a little more open in their general structure. Carbonaceous strata are occasionally seen but no calcareous layers are found near the surface.

As a rule, all of these shales weather to a heavy silty clay, which has a decided tendency to assume a red or reddish-yellow color. The depth of the weathered residue seldom exceeds 3 or 4 feet, while on the steep slopes it is much less. In nearly all old fields the surface of the knolls and sharp ridges is covered with yellow-brown pieces of shale, and in each little gully weathered shale in place may be seen beneath the shallow covering of reddish clay.

In depressions and where the surface has less inclination the soil has a great depth. In such places it usually contains considerable fine sand, and the percentage of silt is higher than in the strictly residual material.

The semialluvial soils along the minor drainage lines, seldom more than a few acres in one body, are brown, silty loams, very fertile and easily tilled if the drainage is good.

Most of this type is found in the south-central townships, and the topography is more varied than that of the higher table-land to the north and west. Besides the sandstone-capped hills previously mentioned, there are many shale ridges too rough to be of much agricultural value. The lower slopes often spread out into relatively level areas of good farming land.

The valleys near Arkadelphia and the one in which Bremen is located are general depressions between the outlying spurs of the plateau. Excepting the narrow strip of alluvium along the creeks, the surface consists chiefly of low ridges and knolls with moderate slopes. The depth of the soil mass at any point depends chiefly upon the topographic position. In the depressions it may be several feet deep, but on the slopes it is generally very shallow.

Owing to the light character of the first few inches of the soil and the close, heavy structure of the subsoil, this type erodes badly. Some old fields that formerly produced good crops of cotton, corn, and wheat are now abandoned, and many of the steepest hillsides are practically beyond redemption.

In the depressions and on the comparatively level bench lands the yields of cotton range from one-third to 1 bale per-acre. Corn, which is usually given the advantage of location, produces from 10 to 25 bushels. Where the soil is shallow it is particularly susceptible to drought, so that no very close estimates of crop yields can be made. In favorable situations the soil is frequently found to be very loamy and easily cultivated, with a deep clay-loam subsoil which is especially retentive of moisture. Such phases are well adapted to a wide range of crops and the yields are good.

Bermuda grass and Japan clover do well on all phases where the native vegetation has been removed. Redtop thrives well on the low ground and it is probable that by the application of lime clover could be established on many of the warm hillsides. It would be necessary to prepare a good seed bed and sow with a nurse crop of oats or rye. Much of this type, which at present gives very poor returns when planted to cotton, could be profitably used as pasture.

The native vegetation consists chiefly of deciduous trees—hickory, poplar, and several varieties of oak being most numerous. The uncleared ridges and steep hills should remain forested.

The valuation ranges from a few dollars an acre for the roughest land to \$12 or \$15 for that under cultivation. Some of it is underlain by coal, but this is not considered in the above estimate.

The average results of mechanical analyses of representative samples of the soil and subsoil are given in the following table:

Mechanical analyses of Dekalb shale loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
19260, 20208, 20210.	Soil.....	1.9	2.5	1.2	6.0	10.1	58.7	19.6
19261, 20209, 20211.	Subsoil.....	.8	2.1	.8	2.9	9.7	42.0	41.5

DEKALB FINE SANDY LOAM.

The soil of the Dekalb fine sandy loam, to a depth of about 12 inches, is a light-colored fine sandy loam. In many instances as much as 40 per cent of the material consists of the finer grades of sand. The silt content is moderately high and generally there is but little clay present. The soil for the first few inches is very friable, and in many places where more than the average amount of medium sand is present it is quite loose. Its structure is often rendered more open by the presence of a good deal of ferruginous gravel, but there is very little coarse sand found anywhere. Areas in which the gravel is unusually abundant have been indicated on the map by the gravel symbol. When dry the soil is yellowish gray to buff, but when moist it is light brown, becoming yellowish brown with increase of depth.

No very definite line can be drawn between the soil and subsoil. The latter contains a much higher percentage of clay than the former. It is therefore heavier and more compact. The upper portion is generally a yellowish clay loam, with little or no coarse material except a few small gravel. The clay content increases to a depth of 3 or 4 feet, and the lower part of the subsoil is usually a reddish-brown heavy clay loam. It is a little more granular in structure than the upper portion, plastic, and somewhat adhesive when wet, and under usual field conditions it is compact, but not impervious. When exposed in gullies and washes the red surface bakes very hard, but when turned up by a plow and subjected to tillage this material is rather crumbly. It is not so friable as the soil, but by no means is it difficult to reduce to a fine state of tilth.

The basal portion of the subsoil varies in character with the nature of the underlying rock. Where the latter is a sandstone there is usually a stratum, 2 or 3 feet thick, between it and the subsoil proper, which consists of disintegrated rock fragments in a matrix of sandy material much more open than the subsoil. In many places the clay loam rests directly upon the soft reddish surface of the sandstone,

with but a few inches of decayed rock between. In all cases, however, there is good underdrainage.

Where the subsoil rests upon shaly rock with thin layers of clay alternating with the harder material the gradation from clay loam to unweathered rock is more gradual. The transition is generally a friable silty or clayey loam with layers of the more resistant strata intact, but all are more or less affected by oxidation and range in color from light buff to bright red.

A phase of this type, which is distinguished by the reddish color of the subsoil, and usually by a brownish tint of the soil where the latter has suffered some surface washing, is found in many places. These departures from the type are commonly found on the hills near the large streams, and vary in size from a fraction of an acre to rather ill-defined areas of several hundred acres in extent. These red spots are heavier in texture than the average, and therefore require a little more labor to keep in good tilth. They are usually considered of better quality than the light-gray land.

The Dekalb fine sandy loam is the prevailing type in the western part of the county. It has an extensive development on the "mountains" in the northwestern part of the area, where it is derived entirely from a heavy gray sandstone. In the eastern townships it is generally confined to the more hilly or rolling sections along the streams. The native vegetation consists chiefly of shortleaf pine and several varieties of oak.

The soil is very deficient in humus, and even in virgin woodland the dark-colored surface loam seldom exceeds a few inches in depth. The friability and consequent ease of tilth which marks this type is due principally to the texture and relative proportion of the mineral constituents. A very slight increase in the content of vegetable matter, however, makes a great improvement and renders the soil much better adapted to grain crops.

This type being easily cultivated and well drained, is admirably adapted to a great variety of truck crops. Its present use in this respect, however, is limited by the opportunity for the profitable disposal of such products, and also by the indisposition of most of the owners of this kind of land to engage in such business. Sweet potatoes, strawberries, raspberries, and grapes are most successfully grown. In gardens many varieties of small fruits and vegetables are easily grown, and the results indicate that the soil under proper management is highly productive. Of course liberal fertilization is necessary, barnyard manure alone giving excellent results.

The greater part of the type under cultivation is devoted to cotton. As a rule it does not produce a very large plant, but the quality and yield are good. The latter averages about 1 bale per

acre where thorough tillage is given. Commercial fertilizers are commonly used. The quantity applied is usually less than 200 pounds per acre, very frequently much less. No very definite statement regarding the results from the use of the various combinations of potash and phosphoric acid can be made. They usually give an increase in yield, but the first requirement of this type, as already stated, is humus. A very marked increase in growth of both cotton and corn always follows any increase in the vegetable content. The yield of corn ranges from 10 to 15 bushels per acre. On new land the yield is much better, 25 to 30 bushels being secured.

The type is fairly adapted to all the field crops grown in this section of the State. Local differences due to slope, elevation, or to an unusually high percentage of sand in the soil must of course be taken into consideration. In some instances the depth and nature of the subsoil should be given attention. For most truck and small-fruit crops it is to be preferred to the Dekalb loam, while for grains and grasses the latter is to be preferred because of its texture and moisture-holding capacity.

The advantage which either type may possess in adaptation to particular crops may be offset by difference in cultivation. While the normal phases of the Dekalb loam are more retentive of moisture than the average of the fine sandy loam, the latter is frequently found to withstand drought better. This is generally due to the methods of tillage. When both types are deficient in humus and rather infrequent shallow cultivation is given, the fine sandy loam will maintain a comparatively loose surface mulch unfavorable to evaporation, while the loam becomes more compact and loses moisture rapidly. If the latter were managed with a view to conserving moisture, it would give the better results, except in cases where the fine sandy loam has an unusually deep and heavy subsoil.

Improved land located within a few miles of the railroad is worth from \$15 to \$20 an acre. Uncleared land may be bought much cheaper. In the western townships the land companies still have large holdings of uncleared land which are listed at \$8 to \$10 an acre. Improved farms are held at about double this valuation.

DEKALB LOAM.

The soil of the Dekalb loam is composed of about equal proportions of silt and the finer grains of sand. There is usually not more than a trace of medium and coarse sand present and the clay content seldom exceeds 10 per cent. The material is coherent, and in some instances quite plastic, molding easily between the fingers, but if moderately moist it is friable to crumbly. When dry the surface may

be easily reduced to a fine, pulverulent condition, in which the silt content is more apparent than in the moist soil. The first few inches of cultivated land is often a loose, fine loamy sand through the accumulation of the larger soil particles at the surface, but the virgin soil is a fine-textured loam or a silty loam to a depth of 10 to 12 inches. The color ranges from a light-yellowish gray to buff. When dry the surface of old land is gray. The more silty phase assumes an ash-gray tint, which is especially noticeable in depressions and on level areas where the drainage is poor.

The subsoil is a bright yellowish-brown loam. It contains more clay and less fine sand than the soil and therefore is more compact. The clay content increases with depth to within 1 to 3 feet of the underlying rock, where the material is usually disintegrated sandstone or softened shales. The lower part of the subsoil proper is frequently a reddish-yellow silty loam containing enough clay to give it a slightly granular structure. As a rule there is too much silt in the soil mass for the latter to be well developed.

In both soil and subsoil there is more or less red-brown ferruginous gravel. In some places it has accumulated upon the surface to such an extent as to give the latter a brownish color. Usually there are very few of these iron concretions in the lower subsoil.

The depth of the soil body ranges from 8 or 10 feet on the relatively level areas to 4 or 5 feet on some of the slopes. The average may be placed at about 5 feet.

This type prevails in the eastern part of the county where the surface is not so rough as in the western parts of the area. From Cullman eastward and southward to the Warrior River most of the interstream divides have considerable areas of gently rolling land. In such localities the rate of surface and interstitial erosion is not so rapid as on the hilly areas where the greater relief induces a more rapid lateral movement of the ground water. Consequently, less of the finest material has been removed and a soil of heavier texture has been formed. In some instances the heavier character of the soil is due to a predominance of clay and clayey shales in the underlying strata. Occasionally prominent elevations within the larger area of loam have a soil of rather heavy texture due to the presence of argillaceous shales. As a rule, however, the soil on these hills and on the slopes near the drainage lines is a fine sandy loam. In the slight depressions it is unusually a heavy silty loam. If the drainage is poor the soil is very light colored and the subsoil is a mottled gray and pale-yellow silty clay, the peculiar coloration being caused by the drainage conditions. Such areas seldom include more than a few acres.

The areas of this type occurring in the southern part of the county are derived chiefly from heavy bedded argillaceous shales, and the

soil usually contains more silt than is found in the type farther north.

The general surface features of this type render it especially desirable for general farming. It is heavy enough in texture to be reasonably well adapted to corn, grass, and other crops which require a moderately high moisture content during the growing season. In depth, structure, and texture it compares favorably with some excellent types found in other areas. If the deficiency in organic matter were supplied the present average yields of corn, cotton, and such forage crops as are raised could be greatly improved with but slight increase in the application of commercial fertilizers.

The present yields of corn and cotton may be placed at about 20 bushels per acre for the former and two-thirds bale for the latter. In the vicinity of Cullman a great variety of crops is successfully grown. Most of the sweet potatoes and strawberries shipped from that point are raised on this type. Clover and alfalfa have both been experimented with on this soil. With heavy applications of lime the deepest and heaviest phases could be made suitable for these legumes.

The value ranges from \$40 or \$50 an acre for improved farm land near the railroad to \$8 or \$10 an acre for uncleared land located at a considerable distance from any shipping point. A large proportion of the type is under cultivation. In the northeastern part of the county a large acreage has been cleared in the last few years. In this section the price has steadily increased from \$5 or \$10 an acre to \$25 or \$30 for improved land.

HANCEVILLE LOAM.

The soil of the Hanceville loam to a depth of 5 or 6 inches is a rather dark reddish-brown loam. The clay content is high and increases with depth. In cultivated fields, where the various constituents are more thoroughly commingled as deep as the land has been plowed, this change in texture is not so noticeable. Such ground is usually a friable, fine-textured loam of dark color, although the organic-matter content may be quite low. Wherever more than the average amount of vegetable matter is present the soil is exceptionally loamy, often having an open or mellow structure seldom observed in soils of sandstone origin. In the slight depressions where surface washings have accumulated the depth and friability of the material is also increased, while the soil on the gentle slopes may be heavier—a reddish-brown clay loam.

The subsoil is a clay loam, usually brick red in color, but in a few instances approaching an Indian red, and when handled stains the fingers. It has a rather high degree of plasticity, but is not adhesive, so that when very wet it is not so yielding or mirey as some clay

loams. The granular structure of the material is very apparent in exposed sections.

The depth of the soil body does not generally exceed 8 or 10 feet and in many cases it is much less. It rests upon dark-colored sandstone which, as a rule, seems to contain a higher percentage of iron than most of the rock underlying the Dekalb soils. Very frequently pieces of hard reddish-brown sandstone occur upon the surface. Ledges of similar stone may outcrop near by, but in some localities the underlying rock is a rather soft sandstone with clayey partings, not essentially different from much of that associated with the lighter colored Dekalb soils.

Small areas of this type are found in the central part of the county. They usually occur on bench lands lying 15 or 30 feet above the general level of the nearest stream. The surface is generally undulating, with stony declivities near the drainage lines. A few small areas occupy high ridges overlooking Ryan Creek, and numerous small spots, seldom exceeding a few acres in extent, occur on the uplands in the larger bodies of Dekalb fine sandy loam. The latter are not generally typical Hanceville material, lacking the dark loamy character of the latter, although the subsoil may be bright red with a comparatively high clay content.

Crops on the Hanceville loam endure seasonal extremes remarkably well. The texture and structure of the soil body enables it to absorb and retain a comparatively large amount of rainfall. The natural drainage is good, so that any excess of water is soon removed. To this physical property of the type must be attributed, in large measure, its superior crop yields. Under the usual methods of tillage cotton produces upward of one bale per acre, and corn 20 to 30 bushels. Oats and Bermuda grass make an excellent growth on this land, and other grasses and forage crops would be found to do equally well.

At present practically all this type is devoted to cotton or corn. Some fields have produced many successive crops of the former with but little fertilization. The present yields of corn are much below what a soil of this depth, structure, and character of material is capable of producing if the content of vegetable matter were increased. Apple trees thrive particularly well on this heavy soil, and on the few high ridges where this type occurs excellent orchard sites may be found.

Only a few farms consist entirely of this type. In many instances, however, it forms a portion of the tilled land on the areas of Dekalb fine sandy loam. A little higher valuation is placed upon the "red land," since it is more productive. The price may be placed at \$20 to \$30 an acre, depending much upon the location with regard to market.

The average results of mechanical analyses of a typical sample of the soil and subsoil of this type are given below:

Mechanical analyses of Hanceville loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
20234, 20236.....	Soil.....	0.1	1.0	1.7	19.9	11.7	46.5	19.2
20235, 20237.....	Subsoil.....	.5	.6	1.3	16.9	10.1	37.3	33.3

HOLSTON FINE SANDY LOAM.

The soil of the Holston fine sandy loam, to a depth of 6 or 8 inches, is a light-brown to reddish-brown fine sandy loam. When the surface has been allowed to wash, the soil is considerably heavier in texture, being usually a red loam or clay loam. The subsoil is a rather compact clay loam, containing considerable fine sand. It is crumbly rather than granular and is a good absorbent of moisture. This property, combined with the depth of the material, usually several yards, gives this type an agricultural value superior to some of the residual soils which are generally more shallow. It is also probable that the soil mass represents a greater variety of mineral constituents than is common to types of strictly sandstone origin.

The type is of rather limited extent, only a few small areas being found on the Warrior River and Ryan Creek. It occurs on old terraces from 20 to 50 feet above the streams. The material composing the upper portion of these relatively high valley lands has some resemblance to the Lafayette deposits found farther down the Warrior River. It is generally a red, sandy clay of sedimentary rather than residual origin, but contains little or no gravel. It rests upon sandstone or shale, but the thickness of the deposit is much greater than that of the soils found on some of the bench lands. The surface of the largest area has suffered considerable erosion without much exposure of the underlying rock.

This soil is valuable for general farming. The yields of corn and cotton are considerably above the average of the upland types.

The following table gives the results of mechanical analyses of samples of the Holston fine sandy loam:

Mechanical analyses of Holston fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
20238.....	Soil.....	0.7	1.4	2.3	34.6	18.2	35.1	7.6
20239.....	Subsoil.....	.3	.8	1.0	19.7	10.8	36.2	30.8

HUNTINGTON FINE SANDY LOAM.

The soil of the Huntington fine sandy loam is usually a brown or sometimes reddish-brown loamy fine sand, containing but little coarse or medium sand, and very seldom being stony or gravelly. It sometimes contains considerable silt especially in depressions near the bluffs, or in the lower portions of the larger areas found on the inner curves of the Warrior River. Such phases may grade into the Huntington silt loam, for the two types are closely associated.

The subsoil is generally heavier in texture, being a silty fine sandy loam. It contains enough of the finest soil particles, silt and clay, to give it considerable coherency, although it is not compact, being usually rather open in structure. As a rule the lower subsoil is a fine sand, but it presents many variations in texture and structure. The underdrainage, however, is usually good.

The type represents all the lighter alluvial soils on the Warrior River and the tributary streams in the area. Owing to its origin, it necessarily presents considerable variation in texture, depth, and drainage conditions.

Most of this soil is under cultivation, producing about 1 bale of cotton per acre and from 20 to 30 bushels of corn. It is easily cultivated, and even if overflowed in the spring it generally dries off rather rapidly after the water subsides.

The content of vegetable matter is low. Many fields were found where no attempt had been made for a long period to renew the fertility by plowing under green crops. The latter would be highly beneficial in most instances, and would greatly enhance the value of the type for growing corn. Some very desirable areas for raising certain kinds of truck may be found on this bottom land, provided future markets or transportation facilities warrant the attempt. The deep, brown loamy sand which forms the gentle undulations on some of the larger areas is well adapted to watermelons, cantaloupes, sweet corn, or tomatoes. On similar locations it is probable that alfalfa could be grown with considerable success.

The average results of mechanical analyses of representative samples of this type are shown in the following table:

Mechanical analyses of Huntington fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
20226, 20228.....	Soil.....	0.0	0.4	2.7	41.2	21.9	27.1	6.5
20227, 20229.....	Subsoil.....	.0	.1	1.6	33.0	21.6	30.1	13.4

HUNTINGTON SILT LOAM.

The soil of the Huntington silt loam is a dark-brown silt loam, consisting chiefly of the finer grades of mineral particles and usually containing but little humus. It is rather open in structure, the surface being very friable and easily reduced to a good state of tilth. In many instances there is but little difference between the soil and subsoil in color and texture. The entire soil section may consist of essentially the same material, with a slight change in color, the lower part being a lighter or yellowish brown, depending somewhat upon the effectiveness of the underdrainage.

The Huntington silt loam is found in a few places on the Warrior River. These areas are subject to occasional overflow, but for the most part they are high enough to have fairly good drainage. The areas occurring on the small creeks are usually narrow strips and necessarily vary considerably in texture, ranging from a sandy loam to a very heavy silt loam. All of the soil, however, contains a high percentage of silt, which gives it the friability and moisture-holding capacity usually possessed by silt loams.

Most of the type has good natural drainage and as a whole represents the heaviest alluvium found in the area. It is largely derived from shales and occurs on those locations where alluvial deposits of clay and silt should be expected from the character of the surrounding uplands.

A phase of the type occurs along some of the streams where in most places it is underlain at a depth of a few feet by horizontal layers of hard, slaty rock. This, of course, prevents the normal movement of the ground water and consequently much of it is subject to extremes of saturation and dryness. This is indicated by the pale yellow or mottled gray and yellow material with small iron concretions. In wet seasons it is difficult to keep fields in a good state of tilth. Near the foot of the hill where the soil of this phase has a greater depth than in the middle of the valley, the drainage may be fairly good, while the central portions are water-logged. During a short drought the latter may become quite dry down to the underlying rock. Most of this phase is better adapted to grass than to cultivated crops, although where the average depth of the soil exceeds 3 feet and the surface drainage is effective, cotton, corn, and sorghum are successfully grown.

Much of the Huntington silt loam is under cultivation. The yields of corn, for which most of it is well adapted, range from 20 to 50 bushels per acre. Cotton is planted on the better drained and lighter phases and produces upward of 1 bale per acre. A small proportion is devoted to hay—the native varieties, crab and sedge grass, soon occu-

pying old fields, while the more desirable Bermuda grass and Japan clover need but little encouragement to make an excellent growth.

Apart from the rougher land with which it is associated, this type is valued at about \$25 an acre.

The following table gives the average results of mechanical analyses of samples of this type of soil:

Mechanical analyses of Huntington silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
20230, 20232.....	Soil.....	0.1	0.3	0.2	7.1	19.4	52.5	20.3
20231, 20233.....	Subsoil.....	.1	.1	.4	15.1	20.9	41.0	22.7

ROUGH STONY LAND.

Rough stony land embraces those areas of nonarable land found in the deeper stream gorges and on the steep flanks of the "mountains." Where the topography precludes the use of the land for agricultural purposes no classification of the soil has been made. It necessarily varies greatly in depth and character. Much of the surface is bare rock outcrop, as on lower Ryan Creek and on some of the other streams in the southwestern part of the county. The steep slopes above these outcrops and in the ravines usually merge into a stony loam on the higher ground.

In the southern part of the area, where the table-land drops off abruptly to the shale loam, the steep hillsides usually consist of shale outcrops. In places there may be but little stony material. There are also occasional coves where a few acres of cultivated land may be found. The small isolated areas near Arkadelphia are conical hills or short ridges of shale capped with sandstone.

Except for the standing timber most of this type has little agricultural value. It is better adapted to forestry than to other purposes.

SUMMARY.

Cullman County is located in the north-central part of Alabama. It includes 741 square miles of the Cumberland Plateau. The general elevation of the northern part is about 800 feet above sea level with a gradual decline toward the south. The eastern half is rolling to moderately hilly, with the steepest hills along the larger creeks. In the western part the divides are generally narrower, with much hilly and broken ground as they descend to the creeks. The flat-topped spurs of the northwestern portion consist largely of "moun-

tain" lands bordered by deep gorges. The south-central townships have a lower average elevation. The topography consists more generally of ridges with narrow valleys between.

All the area was originally forested. About one-fifth is now under cultivation. The central part is the most thickly settled. Some of the outlying townships which contain considerable rough land are rather sparsely settled. Many Germans have located in the middle part, while the remainder is occupied by people from Georgia. Most of these settlements have been made in the last thirty-five years.

The winters are mild and the long summers are agreeably modified by the elevation. The annual rainfall is about 60 inches.

The farms are generally small and nearly all are operated by the owners. The agricultural class constitutes all but about 3,000 of the county's population. There are very few negroes.

Cullman, the county seat, is the chief market and distributing point. It is located on the Louisville and Nashville Railroad, which crosses the area from north to south.

Cotton and corn are the principal crops. The former is the "money crop," with practically all the farms located some miles from the railroad. Near Cullman strawberries and sweet potatoes are raised in large quantities. In this section the general farming is also more diversified than in the eastern and western portions.

The price of improved land ranges from \$10 an acre in the extreme southern and western parts of the county to \$50 an acre near Cullman. Uncleared land, suitable for farming, ranges in value from \$5 to \$20 an acre.

Most of the area is in the earlier stage of agricultural development. Much land is now being cleared and improvements of many kinds are in progress. Excellent opportunities exist for the profitable production of pork, poultry, and dairy products. Very little attention is given to stock raising.

The soils are residual, being derived chiefly from sandstones and noncalcareous shales. The average depth is perhaps 5 feet, rock or shale usually occurring at about that depth. Besides some areas of Rough stony land, ten soil types were encountered. The Dekalb and Hanceville soils are upland types, while the Huntington types are alluvial soils of limited areal extent.

The Dekalb stony loam occurs along the streams. Very little of it is under cultivation.

The Dekalb fine sandy loam and loam are associated types having an extensive development in this area. Both are well adapted to cotton, potatoes, berries, and a great variety of forage crops. The loam is the more desirable for general farming, where corn, oats, and grass may be made the principal crops.

The Dekalb shale loam is a heavy type covering much broken land in the southern part of the county. In the little valleys some very desirable farm land is found which produces good crops of cotton and corn.

The Hanceville loam, a heavy dark reddish-brown soil, is generally superior in agricultural value to the Dekalb soils.

The small areas of bottom and terrace lands in the southern part of the county are essentially local types. The Huntington soils are valuable for corn, to which they are generally planted. The fine sandy loam affords some excellent land for trucking, but the distance from markets prevents its profitable use for this purpose.

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